

STATE FACILITY SOLAR POWER PURCHASE PROGRAM (2004-1)

REQUEST FOR PROPOSALS (RFP Released April 22, 2004)

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Site: UC Santa Barbara

Date of site visit: May 17, 2004

General Information:

- Roof penetrations are allowed if roof warranty is maintained (warranty is through Sarnafil)
- Conduit runs not allowed on exterior of building
- Electric service is at 480v
- Water is not available on the roofs. Bidders to install water bibs to provide water for maintenance/cleaning on roof
- UCSB design requirements are at <http://facilities.ucsb.edu>
- DSA performs only access compliance plan review for UC or CSU. Such a plan review would only be required if structural modifications were being made to an existing structure to support the solar equipment.
- Bidders are responsible for determining if roof can support additional loading requirements
- Eucalyptus trees on south side of Rec Center can be trimmed as necessary

Site Specific Information:

Event Center:

- Roof application: 50,000 sq ft new Sarnafil roof

Rec Center:

- Roof application: new 40,000 sq ft built up roof. No space for inverter on electrical room. Bidders to propose location. The Rec Center will be occupied in January of 2005.

CPS III:

- Parking Structure: 6 story structure to be completed in 12-18 months
- Bidders are responsible for all solar support structures

Site: CSU Long Beach

Date of site visit: May 18, 2004

General Information:

- Campus load is 7-8 MW base load and 12-13 MW peak load
- Primary meter at substation; 66 kV, dual feed from load serving entity; 12 kV internal distribution loop (campus distribution)
- Year round operations – 6 am to 10 pm
- There is a potential staging area in north campus, but would prefer if bidders delivered material on an as needed basis from a separate location.
- The campus will be engaging in multiple construction projects during the summer of 2004.
- Schedule for installation at parking lot needs to be tightly coordinated with regular school schedule (e.g. winter break)
- Cannot cross “driveways” for parking lot installation
- 9 foot clearance height requirement for parking lot installation
- CSU desires PV system to tie in campus energy management system; EMCS includes sub-metering for each individual building on campus
- CSU design requirements are at:
 - <http://www.calstate.edu/CPDC/CM/CGC.shtml>
 - http://www.calstate.edu/CPDC/AE/Design_STDS.shtml
 - <http://www.calstate.edu/CPDC/>

Site Specific Information:

Corporate Yard:

- Small/medium-sized parking lot available for covered dual entry parking. Two separate structures which are used as charging stations for electric utility carts. Electrical tie-in is at East end of the lot next to the substation. Potential bidders must be cognizant of traffic patterns into and around the corporate yard– avoid garbage bin area.

Lot 9:

- Very large parking lot available for covered parking. Electrical tie-in at adjacent brick building in the basement area. Trenching will be required to tie in to electrical room – approximately 100 ft through asphalt, concrete, and a planter box. There may be CEQA issues with visual impacts on residential/commercial neighbors.

LA-5:

- Roof mounted system. No room in electrical room for inverter. CSU to confirm roof can support inverter. Trees can be trimmed. Exhaust fans will be removed. Gravel/asphalt roof.

Library:

- Older roof with many obstacles. Capital plan includes a new roof in 12 months, but may be delayed. Electrical interconnect is on roof.

Site: CSU Dominguez Hills

Date of site visit: May 18, 2004

General Information:

- Site is currently an open field
- Size is approx. 300,000 sq. ft.
- Electrical interconnection is in the central plant across the street on the north-west side of the lot – trenching will be required from the parking lot through the street and across the parking lot of the central plant facility. Opportunity to insert a conduit for the purpose of running a power line under the road (utility service access) during the construction of the parking lot may present itself, but would have to be addressed quickly (i.e. specs and requirements for conduit size, etc.).
- Central plant is currently undergoing a modification/upgrade of the electrical infrastructure (e.g. main power panels, etc.).
- Inverter location best in north-west corner of lot
- Parking lot is scheduled for completion Fall or Winter of 2004
- Reclaimed water can be made available for maintenance purposes.
- CSU design requirements are at:
 - <http://www.calstate.edu/CPDC/CM/CGC.shtml>
 - http://www.calstate.edu/CPDC/AE/Design_STDS.shtml

o <http://www.calstate.edu/CPDC/>

Site: Metropolitan State Hospital, Norwalk, CA

Date: May 19, 2004

Projects: Many possibilities; see below.

General Information:

- Looked at 7 possible building sites. All except main warehouse have flat roofs; warehouse has a pitched roof.
- Square footage information on site documents need to be corrected for 3 buildings (CT East 99,720 sf), CT West (98,280 sf), and Old Administration building (16,038 sf)
- There will be no extra charges to bidders for security personnel or services. The only site offered that is in secure area is CT East building, where materials and tools would need to go in/out each day through the security “sally port”.
- There are no specific site design guidelines at Metro.
- Staging can be global or site specific.
- State DGS self-certifies on OSHPD
- Provided hand out of rules for construction workers re: on-site vehicles, cameras, keys, extra security inside locked buildings, ID badge, etc.
- Siemens is currently upgrading the energy management system at this facility.
- A question was raised whether bidders can “bundle” their own chosen set of facilities on which to offer discount for multiple installations at this location (i.e. self-select a bundle of solar locations at Metro State Hospital).
Answer: is YES, bidders can do this, but also are requested to bid a price for each individual building/location offered. A bidder can decline to bid a price for a specific building or location that they think is not feasible.

Electrical Information:

- 1 main generation building in middle of campus; 1 main SCE meter for power delivery. There is no sub-metering on individual buildings now. Just one main meter to SCE for entire hospital complex.
- Each building or complex has its own transformer (208 volt); laundry is 480 v with step down to 208.
- Phone lines are in buildings but not necessarily near location of solar panels/inverter. Wireless technology for metering permissible.
- Site manager indicated the site requests solar bidders to include in their bids individual meters at each facility where a solar system is to be installed, at bidders' expense. The meter would need capability to measure both solar output and the host building's total electrical load/use. Site suggests this meter be the equivalent of the following meter.

There is no obligation on bidders to use this specific manufacturer or model. Please follow the link: http://www.emon.com/html/dmonthree_g.html . At that web page are links to information on data output ports to permit data to be exported to the site's current EMS system.

Site Specific Information:

Main Warehouse – single story building with pitched corrugated metal roof

Old Administration building and remainder of the buildings in “100's” buildings

- Each has penthouse mechanical room, gravel roof, extensive piping and conduit on roof. OK to cover up power conduit, but not to cover the chilled water lines.

Laundry

- Room for inverter adjacent to the equipment-full cinder block electrical room. Alternatively room for inverter outside.
- Roof is 2-year old “cool roof”
- Several HVAC package units located on the roof.
- Single story building.

CT West (note: CT East is exact replica building-wise, but inside the security fence area)

- Gravel and asphalt roof, two story building.
- CT East and CT West anticipate needing re-roofing in 2006 or shortly thereafter. Department of Mental Health staff has confirmed that it is not possible to move up the work schedule through the normal State capital project system. Accordingly the site particularly welcomes bids of solar systems that offer an integral new roof surface, expected to have a life of at least 15-20 years. This would apply only to the portion of the roof suitable for solar power production. Bids from all types of solar systems will be evaluated and the decision criterion remains that solar system and its bid price that will produce the greatest net present value savings at this site.
- OK to put solar panels above the existing air handling equipment on 2 of the wings. Rack mount for solar panels would be attached to the existing mechanical equipment screen walls, although bidder would need to perform a structural evaluation to determine if the screen wall can support the applicable weight of the rack and solar panels.
- Inverter could go on roof on rack in enclosed mechanical equipment area.

Skilled Nursing Facility

- Loading dock has a spot where concrete pad with transformer and inverter could be placed
- Single story building.

Site: CSU Fullerton

Date of site visit: May 19, 2004

Project: New parking structure under construction. Completion expected August 2004. Install solar above approx. 150,000 s.f. top deck.

General Information:

- Top deck of garage about >75% flat, and <25% sloped ramp (with angled parking spaces both sides) down to lower level.
- 5 story parking structure.
- No analysis was done for ability of top deck to support solar structure. Structural analysis is part of solar bidders' costs and prices.
- Solar installer will need to install lighting equivalent to fluorescent fixtures on floor below.
- Re: aesthetics—note that top deck is visible from somewhat distant Executive office building.
- Top deck has fire protection water (not necessarily potable) for washing PVs, as long as scheduled at time when top level not needed for parking
- See CSU design guidelines at:
 - <http://www.calstate.edu/CPDC/CM/CGC.shtml>
 - http://www.calstate.edu/CPDC/AE/Design_STDS.shtml
 - <http://www.calstate.edu/CPDC/>

Electrical Information:

- Campus distribution system is 12 kV. Each facility has its own transformer.
- Parking facility has 480/277 volts; Electric transformer room on 1st level of garage (below grade)
- New garage will just have received pole-mounted HPS lights on top level, which will need to be removed for other use by campus – campus will remove the poles.
- OK to put inverter on top deck, taking out a couple of parking spaces, as long as cage off from moving vehicles. Cannot place inverter on perimeter of structure.
- Can run conduit down through a core or via approx. 6-inch horizontal gap between level and sloping floor slabs. (Also same way storm water pipe runs.) Will need to x-ray for any coring.
- Install T-5 fluorescent lighting beneath solar installation, to match lower floors (net height clearance to match lower floors)
- Facility will have EMS connection, and PML sub-meter. Also has phone lines.
- Lights will be on EMS – daylight sensor and motion sensor in 48 banks across 5 levels.

Site: Patton State Hospital, Patton

Date of site visit: May 20, 2004

General Information:

- Remaining feasible sites include: Kitchen, Administration Building, Auditorium, Parking Lot K, Old Commissary, and Shops/Warehouse buildings (see table.) All sites within security zone were eliminated so no remaining issues about procedures and time for contractor to gain access to secure facilities.

ROOF INFORMATION

LOCATION	ROOF PITCH	DISTANCE FROM RIDGE TO EAVE (ft.)	LENGTH (ft.)
Paint Shop	4/12	40	203
Motor Pool	4/12	22	100
Main Warehouse	4/12	40	100
2 south facing hip roofs	4/12	40	100
Carport (North)	1/12	22	81
Carport (South)	4/12	40	81
Electric/Engine ering shop	4/12	40	293
Old Commissary	6/12	26	73

Note: large open field on North side of campus that group looked at is NOT available, due to unresolved lease issues with current lessee. May not be resolved for 1-2 years.
Facility pays SCE rates currently 19 cents/kWh on-peak and 9 cents annual average.
Hard copy of selected plans provided to those attending site visit. Also 8 ½ x 11 sheets with brief profile of selected sites, their electrical profile, and drawings of plots (no scale offered).

Electrical Information:

State hospital facility has 4.2 kV system, transformed to 480/208 volt.
SCE substation is at S end of campus; 1 meter for entire set of facilities.
Campus load is 3 MW.

Back-up generator tested weekly for half-hour (7:30 – 8:00 a.m.), if need to protect solar system.

OK for solar system to feed into the site's distribution grid.

Parking Lot K has 2 feeders

All feeders are 4/0 wire, 225 amp.

Site Specific Information:

Kitchen Building: The rooftop appeared very “busy” with vents and A/C equipment, based on drive-by view from higher ground. Bidders indicated the building was not a feasible choice and we did not stop at the building.

Parking Lot K: Large open lot for possible solar parking lot structure. Any proposed parking lot structure applications shall maintain 12’-0” clearance below and shall provide lighting to maintain a 2 foot candle level in all areas obstructed by structure from existing site lighting. Solar equipment is allowed to cover both parking spaces and lanes. Extension of solar parking lot structure is also allowable at same height onto adjacent unpaved ground on N and E sides (expansion room for parking lot). Current lot approximately 100 ft x 234 ft. Expanded would be about 270 ft x 300ft. Solar company could remove/move small interior trees now planted in lot, but not southern perimeter trees. 2 electrical feeders for interconnection are behind the east sally port, about 200-ft away from edge of parking lot in outdoor wire-caged enclosure. If a “carport” type structure was created with a continuous structural roof deck rather than an intermittent “open grid” system, gutters and downspouts would be required to avoid the sheeting of water off of the roof and resulting water damage to vehicles and paving.

Warehouse buildings: Buildings on N side of campus. Corrugated-metal, sloped roofs. Few obstructions, many with south orientation. Need to check on ability to support solar structure. On close look, fairly thin metal roofs. Not designed to be walked on. There are no roof plans for these facilities. Roof pitched to N and S, few roof vents. Buildings on an electrical feeder, with another 2 feeders downhill about 200-250 feet.

Shop Buildings: Twin buildings. One solar company measured building as 202 ft long, and with 35 feet edge to peak on each roof side.

Open-air truck ports, and covered storage area for dumpsters. Pitched roofs, of varying pitches.

Old Commissary building: similar to shops, except has asphalt shingles.

Site: Chuckawalla Valley State Prison and Ironwood State Prison, Blythe

Date of Site Visit: May 21, 2004

General Information:

- Chuckawalla is the only site visited; did not have access to Ironwood
- Prison prefers siting both 1 MW projects at the one site, if possible
- Ironwood site apparently has significant drainage/flooding problems
- Current Chuckawalla electrical load is approx. 2.7 MW
- Prison is to install a new chiller plant that will increase the load further

- Site is approx. 5-10 acres located approximately 50 ft from substation and main power panels/switchgear room. Telephone access is available in the main power panel/switchgear room
- Will have to trench under road leading into the corporate equipment yard.
- Available access to water for washing of solar panels via irrigation system.
- All contractors must go through security clearance process; daily check in required during construction; maintenance will also have to be coordinated with facility staff.
- Water is metered at these facilities. Bidders will have to take this into account as an added maintenance cost

Site: DGS Office Building, Santa Rosa

Date of Site Visit: May 24, 2004

General Information:

- Site is a 94,000 sq. ft., 4 story office building
- Roof is a 1 year old, negative pressure “2001” membrane roof
- Penetrations are allowed only if bidder can maintain existing warranty
- Electrical interconnection is on the ground floor. An electrical conduit chase exists from the roof to the ground floor, but does not directly connect with the electrical room. Some coring through concrete walls will be required – no need for x-rays since building construction is not post tension concrete
- Inverter location either on roof, subject to weight limitations, or on ground near electrical interconnection
- Bidders’ planned solar panel layout must include access/pathways to exiting HVAC equipment currently located on the roof
- Site has had problems with crows picking at roof caulking and wiring. Bidders should take care to secure all wiring

Site: UC Office of the President, Oakland

Date of Site Visit: May 24, 2004

General Information:

- Site is a 6 year old, 12 story high rise office building, with a penthouse on the roof through which the roof is accessed
- Freight elevator only to the 12th floor. Will need a crane to deliver panels
- Roof is a Sarnafil membrane roof over a metal pan
- The electrical room is located in the basement. There is an area where a chase can be installed. This area passes thru the electrical rooms of the building and would not require drilling at each floor. UC will not allow conduit on the exterior of the building

- A vacant lot exists to the north-east of the site. There are height restrictions for the site that would limit any potential problems due to shading
- All drilling and heavy work needs to be done after hours or weekends

Site: Caltrans Office Building, Stockton

Date of Site Visit: May 25, 2004

General Information:

- Site includes several small office buildings and a parking lot available for PV
- Each building generally has its own electrical service and meter
- The District Office roof is 12 years old and constructed of tar and gravel over foam insulation
- The parking lot may only be covered from the western end of the District Office building to the western end of the lot (near the Program Project Management building). Bidders may extend the array over the planted area on the south side of the lot to the fence separating the fairgrounds property
- Bidders can remove/trim trees in the designated parking lot area (action must be coordinated with District staff.)
- 9 ft. clearance of carport is fine, but a driving lane needs to be kept open for taller vehicles
- Covering walkway next to parking lot installation site is encouraged.
- A good inverter location for the parking lot is at the NW corner of District Office Building
- Underground conduit exists for utility service access to power panels for parking lot installation.
- Any core drilling to be done off-hours
- Conduit may be run on the exterior of the buildings
- The building designated as "Shop 10- B1" is off limits due to roof and building disputes with contractor
- Existing Shop Building B-2 is a corrugated metal roof.

Site: University of California, Santa Cruz

Date of site visit: May 26, 2004

Project(s): Classroom Building, Performing Arts Building (Theater Arts), Music Building

General Information:

- Construction schedule at Music and Performing Arts buildings needs to be coordinated around some (e.g.) evening performances. Campus has these scheduled 1 year in advance, so easy to determine.

- Campus not inclined toward ground-mounted solar due to viewing open space as “sacred”, even though extensive open field areas.
- Panels shall not be visible from the ground. This means that any support structures should be kept away from roof edges and in the case of the music facility the panels should be flat on the roof. Any potential glare issues from low sun angles may need to be mitigated with non-glare glass.
- The contractor(s) shall install protective roofing walkway pads around the perimeter of the new equipment and leading to access ladders. The walkway protective surface shall meet the recommendations of the roofing manufacturer without voiding the warranty.

Electrical Information:

- 1 campus meter for connection to PG&E Service
- Campus already has 2.5 MW cogen plant, so has necessary switching to prevent backfeed onto PG&E system
- Campus load is 4-5 MW at minimum, and 8 MW at peak. Expected to grow.
- 12 kV campus distribution system. Performing Arts has 208 V, other 2 buildings are 480 V.
- Buildings are individually metered for the campus’ own use.

Site Specific Information:

Classroom Unit: Building comprised of 2 large lecture halls. Outside electrical cage has 400 amp power panel. Inverter could go inside building in corner nearest outside panel (20-30 ft if core through wall and trench to cage) but if 60 db noise, may not be desirable adjacent to lecture halls. Could put transform outside in cage due to heat and noise.

Recent re-roof was a tear off. Roof about 1/3 shaded due to redwood trees on SE and S sides, which are still growing.

Performing Arts Building: Electrical room has 1200 amps @ 208 Volt. There are spare 2-inch conduits that run “upstairs” 1 flight to back of theater stage, not to roof. There’s plenty of footprint in electrical room for inverter (@ least 15’ x 20’, perhaps more). Also possible to put inverter on roof (but bidders must ensure structure can support).

Roof: Note the NORTH orientation on diagram distributed in advance electronically is off by 90 degrees (adjust by turning clockwise 90 d.) Roof is 147’ square. No tree trimming permitted, Has 1 large redwood on E/SE side.

Music Building: NORTH orientation is off on plot plan distributed electronically. Rotate 45 degrees clockwise to adjust. Electrical room 480 Volt, 1600 amp. Couple of spare breaker locations in panel. No room for inverter in room; would have to be outside the door on loading dock area (check fit). There’s an upper roof and below that an “interim roof” above the loading dock area (note for any coring for conduit).

Roof: Would need to run conduit from roof in “raceway” tight to building in straight lines down building wall, across 2nd roof, down the building wall again, across lower roof to a point above the electrical service connection, where a waterproof roof penetration shall be made. All raceway shall be painted to match the adjacent visible surface (i.e. wall or roofing). Building is stepped on a hillside, and has 3 cascading roofs. Roof surfaces are somewhat visible, so the inverter shall be placed in the enclosed mechanical/electrical area below.

Site: Cal Polytechnic University – San Luis Obispo

Date of site visit: May 27, 2004

Project(s): Engineering West building

General Information:

- Handed out floor plans and roof plan for building.
- CSUS, unlike UC system, sends designs to the State Architect’s office for approval of access issues.
- That, plus lead time to get projects onto Trustees committee and full CSU system board for review could mean 1-year lead time before construction, but CSUSS staff indicate they expect to make this faster.
- Staging access works best in summer, harder the rest of year due to classes. Could be in courtyard area. Crane and truck access could be more challenging given many small trees in courtyard and 1-story apron roof on courtyard side. There is better roadway access up to roof on S-SE side of building. For short-term staging (e.g. 1 week for major lifts of material), could use the outdoor “concrete testing lab” area during summer or Xmas and spring breaks.
- Adjacent 2-story building to south will be torn down (#12 on campus map) and have new 2-story construction. Will be shorter than engineering building. This may cause coordination issues to arise for staging of construction materials. Demolition schedule for the adjacent Building 12 is June 2005, with re-construction to follow.
- In planning maintenance frequency, note that surrounding fields have cattle and other farming, and with fog, dirt and dust stick.
- Considered adding an open parking lot site to possibilities, but given their power prices, trees bidder group suggested leaving this for a later round.
- See CSU design guidelines at:
 - <http://www.calstate.edu/CPDC/CM/CGC.shtml>
 - http://www.calstate.edu/CPDC/AE/Design_STDS.shtml
 - <http://www.calstate.edu/CPDC/>

Electrical Information:

- Campus has 2.5 MW base load. Chancellor looking at a possible 3 MW cogen system which would stabilize their average electrical price.

- Pays 9.8 – 9.9 cents/kWh on average now, expecting 10.1 – 10.5 cents in next year. Is a Direct Access customer.
- Campus has a SCADA system that measures at 12 kV level. Will want to tie in solar data to see how it affects campus.
- 2 places could put inverter in electrical room. Bidders at visit seem to think no 1 spot is big enough for likely inverter size needed, so might need 2 inverters of smaller size.
- Prefer that conduit NOT run on exterior of building, would prefer it go via column cored through a corner of classrooms. But would look @ exterior “sleeves” for conduit for roof if price would be better.
- OK to put inverter on roof if roof will support. Bidders need to do structural assessment.

Roof Information:

- Most of the building will get a new single-ply membrane roof Summer 2004. Will be concerned about roof penetrations & how track any potential leaks (between roofer and solar company). The small stand-alone roof area will remain gravel.
- Roof is U-shaped, with a gap on one side of the U. 2nd floor roof (see floor plan) also could be used but might have shading from 4-story wing to South.
- Most of roof area is gravel roof.
- Solar panels could be installed on roofs of the mechanical penthouses to make up for roof area off-limits due to penthouse shadows.